



IN MEMORIAM

**Aloys L. Tappel**  
Professor of Food Science and Technology, Emeritus  
UC Davis  
1926-2017

Aloys L. Tappel left a lasting legacy of scientific discoveries, methodologic advances and a spirit for scholarship and mentoring. Al was born in St. Louis, to Aloys and Julian Tappel. Al's career in science began early while he was at parochial schools and St. Louis University High School. He received his bachelor's degree in Chemical Engineering at Iowa State University. Al received his Ph.D. in Biochemistry at the Hormel Institute in the University of Minnesota under Paul Boyer, later a Nobel laureate, and Walt Lundberg. Al's future in lipid chemistry was ensured when he met his future wife, Ardelle Amber Fish, in lipids class on the St. Paul campus of the University of Minnesota. Aloys and Ardelle married in 1951, in the Chapel of the Cathedral in St. Paul, Minnesota. Al and Ardelle raised 6 children in Davis.

Al was personally hired by Emil Mrak in 1951 to join the Department of Food Science and Technology first as an instructor, and in 1953, he was promoted to assistant professor. Al's entire career was located at UC Davis, bringing considerable reputation to the campus and especially to the Department of Food Science and Technology, his home for 50 years, as associate professor, 1957-1961; professor, 1961-1994; and professor emeritus from 1994 until his death. During his 50 years on the faculty, he developed several courses including a graduate class in food biochemistry and an undergraduate class in food analysis. His quiet mentoring style and precise quantitative principles set a philosophy for teaching food chemistry that remains a cornerstone today.

Al's greatest contributions were his astonishing body of research relating biochemistry and chemistry to food, nutrition and health. Over his career he mentored and collaborated with graduate students, postdoctoral scientists and visiting scientists. Al's research resulted in more than 500 peer-reviewed scientific publications in a broad range of scientific journals generating over

25,000 citations. Al collaborated with 13 Ph.D. students, 34 post-Ph.D.s and 58 visiting scientists and faculty members.

Al's scientific contributions largely focused on the causes and biological responses to the chemical processes of oxidation. Al was a major thought leader in examining the insidious free radical reactions involving oxygen whose biological implications occupied his attention throughout his career. Al's work led the scientific community to realize the central role these reactions have to virtually all deteriorative processes during aging. Al was the first to coin the scientific term "peroxidation" in order to distinguish the oxidative reactions involving peroxide (which are deleterious to tissue) from the oxidative reactions involved in the productive metabolic utilization of lipids for energy. His work led to the development of innovative methods to assess oxidation, models of oxidative damage and quantitative mathematical models of the complex processes of lipid peroxidation. Yet it is his research on the biological responses to and protections from lipid oxidation that represent his greatest legacy to science and to human health. He was one of the first biological scientists to embrace the concept of integrative biology with his vision for multiple, coordinated protections from oxidation. He demonstrated that combinations of antioxidant protections including small molecules, enzymes and nutrients are more effective in preventing peroxidation than each alone. As the scientific field of cancer pathology recognized that oxidation reactions were involved in several steps of cancer development, Al demonstrated that antioxidant protections held the potential to slow the development of cancer.

Al Tappel was a remarkable scientist both for his depth of focus on oxidation and for his breadth in examining biology's reaction to it. He recognized that certain enzymes, notably glutathione peroxidase, were critical protective factors that cells elaborate to detoxify the products of peroxidation. He demonstrated that the nutritional support of these biological pathways is key to endogenous antioxidant protection. Al shocked the entire scientific community when he proposed that the amino acid code, assigning codons to amino acids, was incomplete without selenocysteine, the amino acid in the reactive center of glutathione peroxidase. Al's quiet, gentle insistence in this bold hypothesis was eventually proven to be true, once again showing that using food as a lens can provide scientists with mechanistic insights that lead the world.

Al was recognized for his numerous scientific achievements with a total of 13 major awards: the 1965 Guggenheim Fellowship, the 1973 Borden Award from American Institute of Nutrition, the 1991 Award of the Agricultural and Food Chemistry Division of the American Chemical Society, the 1992 Supelco American Oil Chemists Society Research Award, the 1995 Alton E. Bailey Medal of the American Chemists Society, the 1995 Chang Award of the American Oil

Chemists Society, the 1997 The Oxygen Club of California Award, and also the 1997 Nicholas Appert Award.

During their long history at UC Davis Aloys and Ardelle Tappell were a fixture, seen strolling through and around the campus, discussing family, friends and always, of course, lipids. Al's legacy of scientific discoveries represents one of California's great contributions to the world of agriculture and food.

J. Bruce German